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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/155,921 05/13/99 DONN

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EXAMINER

HM12/0511

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ART UNIT

PAPER NUMBER

1632

DATE MAILED:

05/11/00

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

9/155,924

Applicant(s)

Donn et al

Examiner

Campbell

Group Art Unit

1632

--The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address--

Period for Response

A SHORTENED STATUTORY PERIOD FOR RESPONSE IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a response be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for response specified above is less than thirty (30) days, a response within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for response is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to respond within the set or extended period for response will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Status

- ☐ Responsive to communication(s) filed on _____.
- ☐ This action is **FINAL**.
- ☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- ☒ Claim(s) 9-16 is/are pending in the application.
- Of the above claim(s) _____ is/are withdrawn from consideration.
- ☐ Claim(s) _____ is/are allowed.
- ☒ Claim(s) 9-16 is/are rejected.
- ☐ Claim(s) _____ is/are objected to.
- ☐ Claim(s) _____ are subject to restriction or election requirement.

Application Papers

- ☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.
- ☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.
- ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- ☐ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

- ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
 - ☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been received.
 - ☐ received in Application No. (Series Code/Serial Number) _____.
 - ☒ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

Attachment(s)

- ☒ Information Disclosure Statement(s), PTO-1449, Paper No(s) 6, 7
- ☒ Notice of References Cited, PTO-892
- ☐ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Interview Summary, PTO-413
- ☐ Notice of Informal Patent Application, PTO-152
- ☐ Other _____

Office Action Summary

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Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 12 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 12 is indefinite in its recitation of "plant, seeds and propagation material." Are Applicants claiming a composition comprising all 3 items? It is also not clear whether all 3 items contain the recited cells, or just the propagation material. Finally, it is not clear what "propagation material" is - plant cuttings, MS agar, potting soil?

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Claims 9-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Coruzzi et al. (AG) in view of Dudits et al. (AH), Temple et al. (AP) and Della-Cioppa et al. Coruzzi et al. suggest producing plants which express a transgene encoding asparagine synthetase and an antisense construct which inhibits production of glutamine synthetase (p. 22, lines 16-19). Coruzzi et al. also suggest that nitrogen assimilation in plants could be improved by targeting asparagine synthetase to chloroplasts (p. 22, lines 3-5), and suggest expressing microbial enzymes (p. 23, lines 2-7). Coruzzi et al. do not disclose a chloroplast transit peptide sequence, nor do they disclose working examples of the suggested transgenic plants described above. Dudits et al. disclose transgenic plants expressing a prokaryotic asparagine

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synthetase (entire document). The plants exhibit increased growth relative to normal plants, and the increased growth is even more pronounced in the presence of glutamine synthesis inhibitors. Dudits et al. teach that the advantage of the bacterial asparagine synthetase is more pronounced during darkness because the chloroplast glutamine synthetase activity is limited at that time. Temple et al. teach that plants contain several forms of glutamine synthetase. The chloroplast enzyme reassimilates ammonia produced by photorespiration, while the cytoplasmic form (in leaves) is expressed only around phloem cells (p. 315, col. 2). Temple et al. also teach that leaf tissue contains predominantly the chloroplast form of glutamine synthetase (p. 317, col. 2). Temple et al. successfully reduced glutamine synthetase activity in leaf tissue by expression of an antisense construct (entire document). Della-Cioppa et al. teach that a number of chloroplast transit peptide sequences were known in the art (pp. 965-966).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to produce plants expressing a prokaryotic asparagine synthetase with a chloroplast transit peptide and an antisense construct to inhibit glutamine synthetase expression. With regard to claims limited to prokaryotic asparagine synthetase with a chloroplast transit peptide, there are several reasons why it would have been obvious to modify the compositions and methods of Dudits et al. to target the enzyme to chloroplasts. Coruzzi et al. suggest targeting asparagine synthetase to chloroplasts. Temple et al. teach that the chloroplast form of glutamine synthetase predominates in leaf tissue, and that the cytoplasmic form produces glutamine for nitrogen transport. If glutamine synthetase is to be inhibited by antisense inhibition as suggested by Coruzzi et al., it would be obvious to target the chloroplast form of the enzyme, since one would want to make photorespiratory ammonia available for asparagine synthesis, rather than inhibit glutamine transport out of the leaves, and simply because this is the predominant form of the enzyme. It then would be obvious to target the asparagine synthetase to the cellular compartment where ammonia is produced and would accumulate. If glutamine synthetase were to be inhibited by application of chemicals, as in the method of Dudits et al., it would still have been obvious to target the asparagine synthetase to chloroplasts, since this was known to be the site of ammonia utilization by glutamine synthetase. Even if

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one were not intending to inhibit glutamine synthetase production at all, it would have been obvious to target asparagine synthetase to chloroplasts because this is the site of ammonia production through photorespiration and it is obvious to target an enzyme to the cellular compartment having the highest concentration of the enzyme's substrate. In conclusion, then, it would have been obvious to target a prokaryotic asparagine synthetase to chloroplasts, with or without simultaneous suppression of glutamine synthetase by an antisense construct, as suggested by Coruzzi et al. There would have been a reasonable expectation of success, given the demonstrated ability of prokaryotic asparagine synthetase to increase plant growth (Dudits et al.) and the successful inhibition of glutamine synthetase activity by antisense expression (Temple et al.). It would have been obvious to use any of the chloroplast transit peptides disclosed by Della-Cioppa et al. to target the asparagine synthetase to chloroplasts. Thus, the invention as a whole was clearly *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

Conclusion

No claim is allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bruce Campell, whose telephone number is 703-308-4205. The examiner can normally be reached on Monday-Thursday from 8:00 to 4:30 (Eastern time). The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jasmine Chambers, can be reached on 703-308-2035. The FAX phone numbers for group 1600 are 703-308-4242 and 703-305-3014.

An inquiry of a general nature or relating to the status of the application should be directed to the group receptionist whose telephone number is 703-308-0196.



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